

THE RESULTS OF ANTISEPTIC METHODS IN THE
TREATMENT OF WOUNDS, AS SHOWN
IN A SERIES OF 100 CONSEC-
UTIVE OPERATIONS.

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The operations are not described in the order in which they were performed, for the reason that a classification of the cases allows of so much more comfort on the part of the reader.

In speaking of this as a list of consecutive cases, it is necessary to state that a few trifling operative procedures, which were sandwiched in with my other work and which are hardly worthy of the name of operation, have been excluded from the table.

The cases thus excluded are: One of subacute pleurisy; paracentesis thoracis; removal of 5 pints of fluid; recovery.

One of ascites; paracentesis abdominis a number of times; removal of 30 or 40 pints of fluid at each tapping; recovery from each tapping.

One of hydrocele; paracentesis scroti; removal of a few ounces of fluid, and injection of a few drachms of tincture of iodine; recovering when last seen.

Two of hydrocephalus; paracentesis capitis; removal of several drachms of fluid, and injection of several minims of Morton's fluid. Practical recovery of one case as a result of treatment; death of the other patient as a result of tonic muscular spasm, which was not relieved by the treatment.

One of crushed finger tip; skin and bone trimmed; primary union.

A number of constrictions of the meatus in cases of gleet; meatus incised; healing by granulation.

A number of small abscesses; incision; granulation or primary union.

The antiseptic method employed was the one which within

a few years has come to be the most popular one among civilized people, and which I chose after experimentation with other methods, the details being as follows :

Instruments were scrupulously cleaned after every operation, and were often dipped into boiling water before use in "dangerous" cases. As a rule the instruments were placed in an 1-30 carbolic acid solution fifteen or twenty minutes before ether was administered to the patient; and they were returned to the solution from time to time as work was proceeded with. An exception to the rule was made in eye cases; and alcohol was used in place of the carbolic acid solution. Towels wrung out of 1-1000 bichloride of mercury solution were placed on the table and about the patient in such a way that instruments when not in use would be dropped on antiseptic surfaces only.

Materials.—Sutures were of catgut, silk worm gut, silk or silver wire. The silk sutures were used only for ligating hæmorrhoids (or for conjunctival wounds), and were prepared by soaking in 1-2000 bichloride solution for one or more days. Silk-worm gut and silver wire were used for suturing bony surfaces together, and for supporting heavy, soft tissues, (used as shot-and-button sutures in the latter case. The catgut sutures, which were employed in the greater part of the work, were prepared according to Kocher's method,¹ and when required for use were either taken directly from the alcohol or were first placed in one of the receptacles containing some other antiseptic fluid. Chromic cat-gut was used in some cases where continuous support for soft tissues for more than two weeks at a time was thought to be desirable.

Ligatures were always of cat-gut, prepared according to Kocher's method.

Drains for large wounds were of absorbable bone tubes, rubber tubes, or cat-gut strands. The rubber tubes were kept stored in 1-2000 bichloride solution, and were only used in the few cases where surrounding tissues would have pressed too tightly on bone tubes or cat-gut strands.

Lister's protective oiled silk, which had been stored in weak bichloride solution, was used to cover the line of sutures in a

¹Raw cat gut placed in oil of juniper for one or two days and then transferred to bottles of alcohol in which it remained until wanted for use.

wound, and to cover granulating surfaces. It prevented the disturbance of the wounds from the slight movements of the dressing which are almost continuous when a patient walks about, and it kept the vicinity of the wounds in a moderately moist condition, so that serum was not backed up by a too close drying of the dressing about the drainage orifices.

Bichloride gauze shaken up into a loose mass was placed next the wound in order to allow of easy percolation of serum. Sometimes carbolized gauze was used instead of the former.

Bichloride cotton was usually placed over the gauze, and it then formed the bulk of the dressing—this for economy's sake principally.

Iodoform was sprinkled over the wound, along the line of sutures, and over that portion of the gauze which lay near the wound, in order to lend accessory antiseptic help.

Bichloride of mercury was used as the sheet anchor of antiseptics. An 1-1000 solution was employed for preparing the towels, the hands of the surgeon and of his assistants, and the skin of the patient in the vicinity of the wound. The 1-2000 solution was commonly used for irrigating the wound from time to time during the course of an operation. An 1-5000 or 1-10000 solution was employed for the peritoneal cavity, and this solution was carefully removed with sponges when the operation was completed.

Carbolic acid solution was used as an irrigating solution in a few of the cases, but it certainly caused an excessive flow of serum, and was therefore seldom employed.

Preparations for Operation.—The skin in the region of a wound was regularly soaped and shaved, whether visible hairs and loose epithelium existed or not. The skin was then scrubbed with a nail brush and washed with 1-1000 bichloride solution. Sometimes ether was poured over the skin in cases where a penetrating antiseptic was required. The hands of all persons who were manually interested in the operation were first washed in soapsuds, and then carefully scrubbed with 1-1000 bichloride solution. Towels wrung out of 1-1000 solution were placed over the patient and about the table in such a way that hands, instruments and materials came in contact with antiseptic surfaces only.

Dressings usually remained unchanged for at least two weeks at a time. Sometimes, on very extensive wounds, they were left in place for four weeks or longer, and, sometimes, when they became very wet with serum, a day or two after the operation, it was deemed advisable to change the dressings under irrigation and apply dry ones in their stead. This latter procedure is rarely necessary, however, because the serum is heavily charged with antiseptics, and it cannot readily decompose. It dries in a day or two and then all goes on smoothly. (Exposed wounds—for instance, those made in the operation for hæmorrhoids—were simply kept under a coating of iodoform). When dressings on a large granulating wound are to be changed, the work must be done with the most careful attention to antiseptic details if the surgeon would avoid suppuration. It is possible to so manage a large granulating surface that no pus will be produced there, but in no other condition of things is more expert antiseptic work demanded.

Among the cases here reported, in which any granulating surface remained after the first change of dressing, a slight amount of suppuration was frequently allowed afterward, because the surfaces were not large, and it was not considered worth while to take the trouble required for entirely preventing the formation of pus. The first dressings, though, were regularly as sweet as new bread at the time of their removal, even when they had been in place during a month of hot weather; and it was the exception to find any sign of suppuration about the largest of the wounds at the first (which was often the last) change of dressing.

In the great majority of cases the temperature remained normal after a period of forty-eight hours after operation had elapsed. In some of the larger operative cases in which bone, synovial membrane or peritoneum were involved there was no notable rise of temperature during the first forty-eight hours, or at any subsequent period during the time of repair, (100° F. considered as notable).

The operations were done upon persons in almost every conceivable sort of physical condition, and often amidst the

most unfavorable surroundings. A large number of the patients were operated upon in towns situated at a distance from New York, and the cases were left entirely to the care of the physicians who had kindly invited me to do the work for them. Owing to the hearty co-operation of these gentlemen in carrying out the rules of antiseptic surgical practice, I have never had occasion to regret my course in consenting to do major operations at the homes of the patients.

In the subjoined list of cases the word "recovery" means, in general, that the natural condition was regained, rather than that life was saved by the operation. The word is here and there impressive beyond its intention, but in order to make the form of the report well outlined it was necessary to fill all spaces for cases according to a certain plan.

HEAD AND NECK.

No.	Name, Age & Sex.	Case.	Operation.	Intermediate Result.	Final Result.
1	G.C., 21, F.	Fibro-sarcoma of sheath of left parotid gland.	Incision about 2 inches in length. Removal of tumor and tissues in contact with it.	Primary union.	Recovery.
2	F.W., 14, M.	Cysto-sarcoma attached to sheath of left parotid gland.	Incision about 2 inches in length. Removal of tumor and tissues in contact with it.	Primary union except at small drainage opening.	Recovery.
3	G.S., 70, M.	Lipoma of neck (nuchal region) and shoulder.	Incisions about 4 inches long and 2 inches long respectively.	Primary union.	Recovery.
4	S.M., 64, M.	Epithelioma of left cheek. Size of chestnut. Three week's growth.	Removal of tumor and skin in vicinity. Plastic operation. 3 inch flap from right arm.	Primary union at margins of transplanted piece, and of wound of arm.	Recovery after sloughing of 2-3 of transplanted piece. Recurrence in submaxillary lymphatics 5 months later.
5	D.M., 64, M.	Recurrent epithelioma in submaxillary lymphatics. Partial eversion of lower eyelid from cicatricial contraction.	Removal of diseased tissues, and ligation of facial artery. V. shaped incision to relieve lower eyelid.	Primary union.	Recovery (5 months elapsed).
6	C.60, M.	Epithelioma of lower lip. Lip almost entirely destroyed.	Removal of remains of lip, anterior portion of chin skin and portions of infected cheeks. Long incision out on cheeks and down on neck for flaps.	Primary union except at little crease near mouth in middle line.	Recovery from operation. (Death from recurrence in neck several months later.)
7	S.T., 40, M.	Lipoma of forehead.	Incision 1 1/2 inches long.	Primary union.	Recovery.
8	J.H., 30, M.	Cervical adenitis and hypertrophy of tonsil (left side)	Removal of glands. Tonsillotomy. Wound of neck left to granulate. Only partial closure possible.	Healthy granulations.	Recovery from operation. More adenitis later.
9	W., 36, M.	Cervical abscess. Broken down glands.	Incision. Wound left open.	Weak granulation.	Recovery from operation. More adenitis later.

HEAD AND NECK.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Result.	Final Result.
10	S. E. 45. M.	Very large submaxillary abscess.	Incision. Contents washed out with antiseptic solution. Wound left open.	Healthy granulation.	Recovery.
11	T. McM 49, M.	No. 32 bullet wound or mastoid process of right temporal bone.	Cross shaped incisions. Chiseling of rough bone. Removal of bullet which lay on dura mater.	Primary union except at central portion. Had to plug there to stop oozing from diploe.	Recovery.
12	J. O. C. 46, M.	No. 22 bullet wound of squamous portion of right temporal bone.	Cross shaped incision. Chiseling of rough points of bone.	Primary union except at small central bruised portion.	Recovery.
13	" 44, M.	No. 38 (?) bullet wound of skull. Bullet entered right squamous bone and passed transversely through skull, cracking skull at left frontal prominence.	Cross shaped incision. Both bone wounds trephined. Bullet extracted through drainage of brain.	No note as regards union.	Death from sudden uncontrollable secondary haemorrhage on following day.
14	— 30, M.	Right side of frontal bone and right anterior lobe of brain crushed by horse kick.	Cross shaped incision about 3x4 inches in extent. Bone trephined and elevated. Large portions of bone and brain removed.	Primary union of skin except at small drainage opening. Marked temporary recovery.	Death 3 days later as result of original injury. Fracture of base of skull found at autopsy.
15	F. S. 27, M.*	Fracture of cervical vertebrae. (old.)	Incision about 7 inches long. Removal of laminae and spinous process of 7th and spinous process of 6th cervical vertebrae.	Primary union except at small drainage point.	Recovery from operation. Death 10 months later as result of original injury.
16	C. M. 70, F.	Senile cataract, (left).	Extraction of lens. Graefe upward.	Primary union.	Recovery.
17	— 30. F.	Prolapse of crystalline lens, (left).	Extraction of lens. Downward corneal incision.	Primary union.	Recovery.

*Reported in ANNALS OF SURGERY.

ANTISEPTIC TREATMENT OF WOUNDS.

HEAD AND NECK.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Result	Final Result.
18	P. L. 6, M.	Convergent strabismus.	Section of left internal rectus tendon.	Primary union.	Recovery.
19	F. B. 28, M.	Convergent strabismus.	Section of left internal rectus tendon.	Primary union.	Recovery from operation. Not complete relief from squint.
20	A. M. 30, F.	Glass wound. Transverse laceration of outer half of right cornea and corresponding portion of iris. Sclerotic torn for one or two lines. Escape of pea-sized piece of vitreous humor.	Iridectomy.	Primary union of sclerotic and 2-3 of corneal wound.	Recovery.
21	M. H. 40, F.	Trichiasis.	Removal of ciliary line and narrow section of skin above.	Primary union except at little unclosed point.	Recovery after secondary removal of two or three lash tubes which had been left previously.
22	W. D. 24, M.	Loss of 1-6 of upper portion of helix of left ear.	Transplantation of flap from temporal region.	Primary union of sutured margins. Granulation of posterior exposed surface.	Recovery.
23	St. J. 35, F.	Cellulitis of whole inferior maxillary region.	Incision on inside of mouth. Evacuation of pus. Wounds left open.	Slow granulation.	Recovery.

TRUNK.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Re- sult.	Final Result.
24	D.38, F.	Tuberculosis (?) of right ovary	Laparotomy. Re- moval of right ovary and tube.	Primary union except three or four pin head sized points in skin.	Recovery from operation. Further development of general tuberculosis (?) at present.
25	T.45, F.	Gall stones in abdominal cavity surrounded by tumor of fibrinous deposit.	Laparotomy. Incision from pubes nearly to sternum. Separation of matted intestines. Removal of gall stones and segment of abdominal wall. Cholecystectomy.	Primary union except at drainage opening, from cystic duct.	Recovery nearly completed 3 weeks out of bed. Still under treatment. (6 weeks from operation) for unclosed, but rapidly closing biliary fistula.
26	B.62, F.	Strangulated inguinal hernia. Right entero-epiplocele.	Incision of coverings and of margin of ring. Removal of large knob of epiploon. Intestine returned and canal closed with catgut.	Primary union except at small drainage opening.	Recovery from operation. Return of hernia about 1 yr. later as result of heavy lift. Truss now used easily.
27	W.58, F.	Chronic peritonitis.	Laparotomy. Exploratory incision 5 inches long. (Patient very large and fat)	Primary union of deep parts of wound. Too early absorption of superficial catgut sutures and separation of skin and subcutaneous fat in incision line.	Recovery (25 days elapsed). Secondary union nearly complete 48 hours after approximation of granulating margins.
28	C.A. 18, F.	Puerperal peritonitis. Patient comatose and pulseless	Laparotomy. Peritoneal cavity washed out with very weak warm bichloride solution.	No note as regards union.	Death six hours later operation relieved markedly for two hours. Then came relapse and death.
29	G.P. 55, M.	Chronic pyelitis.	Nephrotomy. Exploratory incision along margin of left quadratus lumborum muscle. Subperitoneal. Kidney punctured with hypodermic needle.	Primary union except at small drainage opening.	Recovery. (3 weeks elapsed.)
30	J.R. 56, M.	Suppression of urine. Acute parenchymatous nephritis.	Exploratory aspiration of bladder through abdominal wall.	Primary union of needle openings.	Recovery.

TRUNK.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Result.	Final Result.
31	B. 56, F.	Scirrhus cancer of right breast.	Removal of breast, sheath of pectoralis major muscle. Axillary lymph-glands and vessels, and fat and loose connective tissue.	Primary union except at a few little pin-head sized spots.	Recovery (1 year elapsed.)
32	N. 37, F.	Encephaloid cancer of left breast.	Removal of breast, portions of pectoralis major muscle, axillary lymphatics and common connective tissue and fat. Subclavicular lymphatics removed.	Primary union of all opposed tissues. Central uncovered portion 2x1 inches granulating.	Recovering (still under treatment.)
33	U. 71, F.	Scirrhus cancer of right breast.	Removal of breast, sheath of pectoralis major muscle. Axillary lymphatics, fat and connective tissue. Subscapular connective tissue.	Primary union.	Recovery (10 weeks elapsed.)
34	E. B. 47,	Scirrhus cancer of left breast.	Removal of breast, portions of pectoralis major muscle, axillary lymphatics, fat and connective tissue. Subclavicular and subscapular lymphatics and connective tissue.	Primary union of all opposed tissues. Central uncovered portion 2x2 1-2 in. granulating.	Recovering. (Still under treatment.)
35	H. 41, F.	Scirrhus cancer of right breast.	Removal of breast, portions of pectoralis major muscle, axillary fat, lymphatics and connective tissue. Subclavicular lymphatics and connective tissue.	Primary union of all opposed tissues. Central uncovered portion 2x1 1-2 in. granulating.	Recovering. (Still under treatment.)
36	McB. 65, F.	Scirrhus cancer of left breast.	Removal of breast, portions of pectoralis major muscle, axillary lymphatics, fat and connective tissues and subclavicular lymphatics.	Primary union of the long incision. Sloughing of one of the short axillary flaps.	Recovery. (Still under treatment.)

TRUNK.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Result.	Final Result.
37	P. 45, F.	Lipoma of left suprascapula region. Size of fist.	Removal through single long incision.	Primary union except at small drainage opening.	Recovery.
3	B. 42, F.	Double laceration of cervix uteri. Para- and perimetritis.	Denudation of ulcerating surfaces. Approximation of flaps with catgut.	Primary union.	Recovery from operation. Recovering from metritis.
39	P. A. 47, M.	Tuberculous bubo of left groin. Openings on abdomen and in perinaeum.	Incisions 4 in. and 2 in. long. Flaps dissected up. Infected tissues extensively trimmed away.	Primary union.	Recovery.
40	H. M. 19, M.	Chancroidal bubo, right groin.	Single incision. Mass trimmed out.	Left to granulate.	Recovery.
41	J. G. 21, M.	Tuberculous (?) bubo of right groin.	Single incision. Mass trimmed out.	Primary union except at small drainage opening.	Recovery.
42	S. T. 24, M.	Urethral stricture.	Internal urethrotomy.	Granulation.	Recovery.
43	T. F. 44, M.	Urethral stricture.	Internal urethrotomy.	Granulation.	Recovery.
44	C. S. 27, M.	Urethral stricture.	Internal urethrotomy.	Granulation.	Recovery.
45	I. McC. 40, M.	Urethral stricture. Extravasation of urine.	External urethrotomy. Perineal and gluteal incisions all kept widely opened.	Granulation.	Recovery.
46	A. R. 17, M.	Varicocele.	Small scrotal incision. Ligation of veins with silk worm gut.	Primary union.	Recovery from operation, but not from varicocele.
47	P. M. 59, M.	Internal and external hemorrhoids.	Ligation and excision of five large piles.	Granulation.	Recovery.
48	A. W. 39, M.	Hemorrhoids.	Ligation and excision of several of the masses	Granulation.	Recovery.

TRUNK.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Re- sult.	Final Result.
49	G. 40, M.	Hæmorrhoids and fistula in ano.	Ligation and excision of two piles. Walls of fistula trimmed out. Wounds left open.	Granulation.	Recovery.
50	L. S. 32, M.	External hæmorrhoids.	Several tags snipped off.	Granulation.	Recovery.
51	K. 26, F.	Hæmorrhoids.	Ligation and excision of three or four of the hæmorrhoids.	Granulation.	Recovery.
52	M. S. 42, F.	Cold abscess of whole right gluteal region. (No tuberculosis of bone discovered.)	Incision as long as buttock. Walls of abscess scraped.	Granulation.	Recovery.
53	L. S. 22, F.	Extensive mammary abscess.	Several long incisions. Contents washed out with antiseptic solution.	Granulation.	Recovery.
54	N. F. 40, M.	Ischio-rectal abscess.	Incision. Contents washed out with antiseptic solution. Left open.	Granulation.	Recovery.
55	M. 30, M.	Enormous peri-rectal abscess. (Passive pyoderasty admitted as cause by patient.)	Long incision at inner gluteal region of each side, and great quantities of decomposing pus and sloughing cellular tissue washed out with antiseptic solutions.	Granulation.	Recovery.
56	O. 32, F.	Three tortuous fistulæ in ano.	Incision. Walls curetted. Paquelin cautery used over walls of sinuses. Wounds kept open.	Granulation.	Recovery.
57	E. B. 30, M.	Fistula in ano.	Incision. Walls cut out with sharp spoon. Wound kept open.	Granulation.	Recovery.

TRUNK.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Re- sult.	Final Result.
58	U. DiS. 35, F.	Two fistulæ in ano.	Incision. Walls cut out with sharp spoon; wound kept open.	Granulation.	Recovery.
59	L. J. 35, M.	Numerous anal fissures.	Anal sphincters dilated. Margins and bottoms of fissure trimmed with small scissors.	Granulation.	Recovery from operation. More fissures shortly afterward.
60	E. B. 21, M.	Venereal warts.	Removal with knife and cautery.	Granulation.	Recovery.
61	W. N. 22 M.	Venereal warts appearing as extensive cauliflower like growth.	Circumcision. Removal of warts with knife and cautery. Wound not closed.	Granulation.	Recovery from operation. Return of warts later.
62	W. E. 29, M.	Long prepuce.	Circumcision.	Primary union in almost entire wound.	Recovery.
63	E. S. 2, M.	Long prepuce.	Circumcision.	Primary union in almost entire wound.	Recovery.
64	J. G. 21, M.	Long prepuce.	Circumcision.	Primary union in almost entire wound.	Recovery.
65	G. A. 34, M.	Syphilitic necrosis.	Remov'l of port'n of right sup' maxilla including canine eminence, incisive fossa, and ant. nasal spine. Removal of larger part of vomer. Wounds left open.	Granulation.	Recovery from operation. Still under treatment for syphilis.

UPPER EXTREMITIES.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Result.	Final Result.
66	D.K. 35, M.	No. 32 bullet splintered external condyloid expansion, and a couple of inches of the shaft of the left humerus in half of its diameter.	Long incision. Removal of fragments of bone and of bullet. Chiselling of rough portions of bone.	Primary union except at drainage opening.	Recovery.
67	J.S. 2, M.	Tuberculous caries of portion of head and neck of left humerus. Cold abscess of nearly whole outer half of arm.	Incision from just above external epicondyle to acromion process of scapula. Excision of diseased portion of bone; wall of abscess cavity trimmed with scalpel and sharp spoon.	Primary union except at drainage opening.	Recovery from operation. Drainage fistula remains open. Shall operate again.
68	R.H. 17, M.	Necrosis of neck and portion of head of left humerus.	Medullary cavity opened through chiselled canal, and sequestrum removed. Wound kept open.	Granulation.	Recovery.
69	M.S. 58, F.	Compound comminuted fracture of condyles of left humerus (blow).	Long incision through triceps tendon, and down along inner border of ulna. Condyles removed. Rough end of humerus resected.	Primary union except at drainage opening.	Recovery with "flail" joint.
70	N. 50, M.	Hard encapsulated smooth movable tumor in connective tissue of external condyloid space of left arm. (Pigeon's egg size.)	Removal of tumor and capsule through an incision 2 inches long.	Primary union.	Recovery.
71	N.H. 23, F.	Olecranon bursitis. Chronic.	Removed contents of sac, and dissected out the thickened walls. Wound not closed on account of chronic cellulitis in vicinity.	Granulation.	Recovering when last seen.

UPPER EXTREMITIES.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Re- sult.	Final Result.
72	F.F. 16, M.	Cogwheel injury. Transverse section at middle of right forearm crushed and lacerated. Compound comminuted fracture of radius and ulna. Muscles and skin torn apart and stripped from bones. Ulnar artery intact. Nerves paralyzed generally, but none of them destroyed. Narrow bridge of skin over ulna, only skin left at injured part of arm.	Two inches of radius and ulna resected, drilled and sutured with silver wire. Crushed muscles cut away and good ends sutured together with cat gut. Skin margins trimmed and sutured together. (Approximation allowed by a inch shortening of bone.	Primary union in almost whole of wound. Tissues infiltrated with serum so that wound was purposely opened a little for free drainage.	Recovery. Fairly good use of all muscles and nerves, but not until ununited ulna had been resected again and allowed to become attached to radius. Right arm much weaker than left one, but used in "all kinds of work."
73	R. 15, M.	Whole of left thumb crushed, cold and bloodless.	Amputation through metacarpal. Customary flaps.	Primary union except at small drainage opening.	Recovery.
74	— 40, M.	Pea sized cystic tumor (cholesterine within) of sheath of flexor sublimis tendon of 2nd phalanx of 2nd right digit.	Removal of cyst.	Primary union.	Recovery.
75	— 40, M.	Two very large "warts" over metacarpal of right thumb.	Removal of elliptical segment of skin on which warts were situated.	Primary union.	Recovery.

LOWER EXTREMITIES.

76	W.D. 19, M.	No. 22 bullet wound of inner side of right thigh. No important structures injured.	Long incision carried downward to femur.	Primary union except along drainage tract.	Recovery.
77	S.T. 26, M.*	Tuberculous synovitis of left knee.	Volkman's operation. Patella sawn in two and synovial membrane trimmed off with scissors.	Primary union except at upper skin flap which sloughed over patella as result of too firm compression with bandage.	Developing general tuberculosis of the joints of the extremities when last seen.

*Reported previously in Medical Record.

LOWER EXTREMITIES.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Result.	Final Result.
78	F. G. 52, M.*	Fracture of right patella, recent. Two large fragments; one small one.	Cross-shaped incision. Joint cavity washed out. Fragments sutured with two silver wires.	Primary union except along line of one skin incision where sutures gave way too soon.	Recovery. Bony union. Active mobility to right angle at present.
79	P. C. 27, M.*	Fracture of right patella, old. Rupture of fibrous band of union, cause for operation.	Transverse incision. Joint cavity washed out. Bony surfaces of 2 fragments of patella freshened and approximated at lower corners with 2 silver wires.	Primary union except along superficial line of skin incision where sutures gave way too soon.	Recovery. Firm fibrous union. Patient said to use this leg as well as he uses left one.
80	— 40, M.	Housemaid's knee.	Incision on inner and outer sides of tumor. Contents and wall removed with sharp spoon.	Primary union of deep parts. Incision of skin left open.	Recovery.
81	E. H. 21, F.	Housemaid's knee.	Incision on inner and outer sides of tumor. Contents and wall removed with sharp spoon.	Primary union of deep parts. Incision of skin left open.	Recovery.
82	W. A. 42, M.	Suppurative arthritis of right knee. Cause unknown.	Incision on outer and inner side of joint. Joint cavity very thoroughly washed out with antiseptic solutions. Incision left open to carry drainage tubes.	Healthy granulation about tube.	Recovery, with fair use of knee.
83	T. K. 13, M.	Ankylosis of knee following trauma. Leg flexed and fixed. Hamstrings tense.	Complete excision of knee. Silkworm gut sutures for bones. Excision of portions of hamstrings through separate incisions.	Primary union except where 2 or 3 superficial skin sutures gave way too soon.	Recovery. Bony or firm fibrous union. Leg useful.
84	J. F. 30, M.	Epithelioma of leg at old ulcer following compound fracture of tibia.	Amputation at middle of thigh.	Primary union obtained. Healthy granulations.	Recovery.

*Reported previously in Medical Record.

LOWER EXTREMITIES.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Re- sult.	Final Result.
85	J. V. 50, F.	Sciatica caused by malignant tumour of left ovary.	Incision 2-2 in- long. Sciatic nerve stretched.	Primary union at first, but too early removal of sutures allowed wound to tear apart super- ficially.	Recovering when sudden increase of malignant growth caused intestinal perforation and death. Sciatica stopped by the operation. No pa- ralysis.
86	A. F. 35, M.	Ulcerated stump of leg. Amputation years before for compound fra- cture.	Reamputation thro' tuberosity of the tibia. Side flaps; short.	Primary union ex- cept at small drainage canal. Soft free scar.	Recovery.
87	J. S. 83, M.	Gangrene of foot. Chronic cellulitis of ankle.	Amputation at junc- tion of lower and middle thirds of leg. Short side flaps.	Primary union ex- cept at two tiny points. Soft free scar.	Recovery. Using two canes. Walks about town, with artificial leg, and limps hardly at all.
88	M. S. 2, F.	Bow legs.	Incision over mid- dle of upper thirds of tibiae. Tibiae chiseled through. Fibulae fractured.	Primary union ex- cept at narrow line of skin incision.	Recovery. Slight bowing of femurs not worth correct- ing.
89	R. S. 3, F.	Knock knees.	Incisions over most prominent curves of tibiae and fibu- lae. Both bones chiseled through on both legs.	Primary union.	Recovery.
90	J. K. 28, M.	Fragments of ne- crosed bone at site of old compound fracture.	Removal of seques- tra. Wound left open.	Granulation.	Recovery.
91	M. F. 27, F.	Old ulcer of leg.	Thickened walls and floor cut away. Skin grafting la- ter.	Granulation.	Recovery nearly complete when patient disappear- ed.
92	— 50, M.	Old ulcer of leg.	Thickened walls and floor cut away. Skin grafting later.	Granulation.	Recovery.
93	H. D. 22.	No. 44 (?) bullet wound of lower part of left leg. Bullet lodged in os calcis. Abscess of whole of calf of leg.	Bullet removed. Incisions at each extremity of ab- scess, and walls scraped with sharp spoon. Half diameter of tendo Achillis cut away because of slough- ing.	Primary union of larger part of op- posed wall. Skin incision left open to granulate.	Recovery.

LOWER EXTREMITIES.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Re- sult.	Final Result.
94	W. H. 25, M.	Old dislocation at left ankle, 15 years, resulting from rupture of external lateral ligaments.	Excision of articular surfaces of astragalus tibia and fibula at ankle. Bones sutured firmly together with silk wormgut.	Primary union except at small drainage opening.	Recovery, with stiff, strong ankle. Bony union.
95	W. F. 38,	Soft sarcoma (?) involving extensor longus tendon of 3rd left toe. Tumor size of hen's egg and extending upon annular ligament. Similar smaller growths involving sheath of peroneussterilis tendons of both feet.	Removal of tumors, and of three and one-half inches of involved extensor longus tendon.	Primary union except where two or three superficial sutures had disappeared too soon.	Recovery.
96	J. C. 65, M.	Large bunion at first metatarsophalangeal articulation. Right foot.	Excision of distal end of first metatarsal bone.	Primary union except along narrow margin of thin skin which rolled up and separated.	Recovery. Soft scar. Quite free movement at articulation.
97	— 47, M.	Bunions due to hallux bursitis. Podagra.	Excision of bursa.	Primary union except along margin of thin skin which rolled up and separated.	Recovery from bursal trouble.
98	W. W. 14, M.	Second, third, fourth and fifth toes of left foot crushed. Corresponding heads of metatarsal bones crushed. Skin stripped from two-thirds of dorsum of foot.	Excision of crushed parts. Flap made from sole. Large part of dorsum pedis left uncovered.	Primary union of short sole flap.	Recovery after extensive skin grafting; with useful foot.
99	T. 19, M.	"Ingrowing toenail."	Removal of strip of over-hanging integument.	Granulation.	Recovering. Still under treatment.

LOWER EXTREMITIES.

No.	Name Age & Sex.	Case.	Operation.	Intermediate Re- sult.	Final Result.
100	C.M., 40, M.	Deep fistula of foot. Remains of previous amputation wound through first and second metatarsals of left foot.	Long incision. Cartilage-like scar tissue removed.	Primary union.	Recovery. Relapse several weeks later.

SUMMARY.

Whole number.....	100.
Cases in which an attempt at obtaining primary union was made.....	60.
Cases in which primary union was obtained in the whole or greater part of the wound.....	85.
Cases in which the wound was purposely allowed to heal by granulation.....	34.
Cases with intercurrent of septicæmia, pyæmia, erysipelas or tetanus.....	0.
Deaths resulting from operation.....	0.
Deaths resulting from the original disease or injury.....	6.

(Namely, No. 6, recurrent epithelioma; No. 13, gunshot wound of brain; No. 14, crushed skull and brain; No. 5, "broken neck;" No. 28, puerperal peritonitis; and No. 85, malignant ovarian disease.

The cases which I have recently operated upon, and which are consequently still under treatment, are: One laparotomy with cholecystectomy, one exploratory laparotomy, four amputations of the breast, and one ingrowing toe nail. All of these patients are in good condition and I expect nothing less than complete recovery for all of them.

In another and similar list of cases, the operations for hemorrhoids and for fistula in ano would be done in such a way as to gain primary union, instead of allowing repair by granulation to follow.